

Analytical Results for the Community Environmental Monitoring Program (CEMP) Air Sampling and TLD Network—Third Quarter CY2011

The CEMP air-sampling network is designed to monitor and collect radioactive airborne particles from NNSS and non-NNSS related activities, as well as background environmental sources. This report is compiled by the Desert Research Institute (DRI) and summarizes the results from the analysis of the air samples collected by CEMP station managers as part of the community environmental monitoring program.

In general, the CEMP air-sampling network is comprised of 29 continuously operating environmental sampling stations. A total of 27 stations are equipped with a low volume air sampler/totalizer configuration to collect particulate radionuclides on glass fiber filter paper. Ideally, the samples are collected on a bi-weekly basis with a target collection time of 336 hours (two weeks). The samplers are calibrated on a monthly basis by DRI to maintain a collection rate of 1.75 cfm (@ STP). All relevant information such as collection times, variations in flow rate, actual flow volumes, power outages, and other information documenting the integrity of the sample are recorded by the station managers. This allows for the proper interpretation of the analytical results. The air filters are analyzed by a commercial laboratory for gross alpha/beta activity as well as by high-resolution gamma spectrometry. The filters are composited on a quarterly basis for gamma spectroscopy analysis after the gross alpha/beta analyses have been completed.

In the U.S., the principle reporting unit for the measurement of radioactivity in the atmospheric environment is pCi/m³ (picocuries per cubic meter). DRI receives its data from the lab as microcuries per filter. DRI converts the laboratory data unit of measurement to pCi/m³ for the ease in comparison of data.

A summary of the third quarter CY2011 analytical results for gross alpha and beta analyses are found in Tables 1 and 2. These tables document the minimum, maximum, and average values for each of the 27 air-sampling network stations. The last column shows the average annual value from the previous year (CY2010) for comparison purposes. Overall the gross alpha results for the third quarter of CY2011 reflect similar values to previous quarters. These data remain consistent with the average CY2010 analyses used for comparison, especially when analytical error is considered. The third quarter CY2011 beta results are also consistent with previous results.

The third quarter gamma results for CY2011 are shown in Table 3. All of the samples were gamma spectrum negligible (i.e. gamma emitting radionuclides were not detected) with the exception of Beryllium (Be)-7 and Lead (Pb)-210, naturally occurring elements of the atmospheric and geologic environments respectively. Overall, these data are consistent with previous analytical results.

The TLD results for the third quarter of CY2011 are shown in Table 4. Data for the environmental thermoluminescent dosimeter (TLD) is reported in milliroentgens (mR). Overall, the results display similar values to the previous quarters of the last calendar year. The 2010 pressurized ion chamber, or PIC exposure rate and TLD data are also provided for comparison. As with historical data, TLD values are commonly lower than

the PIC results. The overall estimated annual exposure based on the third quarter shows consistent agreement with CY2010.

DRI welcomes and encourages input from the station managers regarding the content of the CEMP quarterly reports. If there is anything you feel we could provide to help you interpret the data or enable you to explain the information to someone in your community not familiar with the program, please let us know.

Table 1. Gross Alpha Analytical Results for the Third Quarter of Calendar Year 2011
(Average analytical error, +/- 0.0007)

Station	Minimum (pCi/m ³)	Maximum (pCi/m ³)	Average (pCi/m ³)	2010 Average (pCi/m ³)
Alamo	0.0009	0.0028	0.0017	0.0016
Amargosa	0.0007	0.0020	0.0014	0.0012
Beatty	0.0007	0.0019	0.0011	0.0012
Boulder City	0.0008	0.0036	0.0016	0.0015
Caliente	0.0007	0.0026	0.0017	0.0018
Cedar City	0.0008	0.0012	0.0010	0.0008
Delta	0.0006	0.0011	0.0009	0.0011
Duckwater	0.0008	0.0032	0.0014	0.0011
Ely	0.0008	0.0017	0.0012	0.0009
Garden Valley	0.0008	0.0016	0.0011	0.0011
Goldfield	0.0008	0.0014	0.0011	0.0011
Henderson	0.0007	0.0018	0.0012	0.0013
Indian Springs	0.0006	0.0015	0.0010	0.0012
Las Vegas	0.0009	0.0016	0.0012	0.0011
Mesquite	0.0010	0.0021	0.0014	0.0015
Milford	0.0007	0.0011	0.0009	0.0012
Nyala	0.0009	0.0016	0.0011	0.0012
Overton	0.0009	0.0031	0.0017	0.0011
Pahrump	0.0009	0.0014	0.0012	0.0013

Pioche	0.0003	0.0017	0.0009	0.0010
Rachel	0.0008	0.0017	0.0011	0.0012
Sarcobatus	0.0009	0.0042	0.0023	0.0019
St. George	0.0005	0.0012	0.0009	0.0011
Stone Cabin	0.0006	0.0014	0.0009	0.0010
Tecopa	0.0007	0.0017	0.0011	0.0013
Tonopah	0.0008	0.0016	0.0012	0.0010
Twin Springs	0.0007	0.0013	0.0010	0.0013

Table 2. Gross Beta Analytical Results for the Third Quarter of Calendar Year 2011.
(Average analytical error, +/- 0.003)

Station	Minimum (pCi/m ³)	Maximum (pCi/m ³)	Average (pCi/m ³)	2010 Average (pCi/m ³)
Alamo	0.018	0.030	0.024	0.017
Amargosa	0.016	0.030	0.023	0.018
Beatty	0.016	0.030	0.022	0.017
Boulder City	0.016	0.029	0.022	0.022
Caliente	0.017	0.026	0.021	0.019
Cedar City	0.015	0.024	0.018	0.015
Delta	0.017	0.025	0.020	0.018
Duckwater	0.014	0.031	0.022	0.017
Ely	0.014	0.031	0.021	0.015
Garden Valley	0.017	0.028	0.021	0.017
Goldfield	0.015	0.028	0.021	0.016
Henderson	0.015	0.028	0.021	0.019
Indian Springs	0.015	0.029	0.021	0.018
Las Vegas	0.016	0.025	0.022	0.018
Mesquite	0.017	0.027	0.022	0.020
Milford	0.015	0.028	0.019	0.020
Nyala	0.017	0.031	0.024	0.018
Overton	0.019	0.029	0.023	0.019
Pahrump	0.016	0.029	0.022	0.017

Pioche	0.014	0.023	0.017	0.014
Rachel	0.016	0.036	0.024	0.018
Sarcobatus	0.017	0.032	0.023	0.019
St. George	0.016	0.025	0.020	0.019
Stone Cabin	0.007	0.026	0.015	0.015
Tecopa	0.016	0.026	0.022	0.019
Tonopah	0.014	0.031	0.021	0.015
Twin Springs	0.018	0.025	0.020	0.019

Table 3. Gamma Spectroscopy Results for the Third Quarter of Calendar Year 2011.

Station	Cs-137 (pCi/sample)	Cs-137 (MDC)	Be-7 (pCi/m ³)	Pb-210 (pCi/m ³)
Alamo	-4.0	12.0	0.123	N.D.
Amargosa	0.0	8.8	0.116	N.D.
Beatty	-0.7	11.0	0.105	0.024
Boulder City	-1.3	11.0	0.119	0.025
Caliente	1.5	8.6	0.125	0.024
Cedar City	0.6	9.8	0.109	0.020
Delta	-0.2	12.0	0.102	0.018
Duckwater	-0.8	10.0	0.111	0.020
Ely	-1.2	11.0	0.136	0.023
Garden Valley	2.7	9.1	0.124	N.D.
Goldfield	-1.7	11.0	0.131	0.015
Henderson	0.1	7.4	0.091	N.D.
Indian Springs	1.7	11.0	0.108	0.015
Las Vegas	0.8	11.0	0.133	0.018
Mesquite	0.2	10.0	0.107	0.018
Milford	-0.6	12.0	0.112	0.017
Nyala	0.0	6.7	0.132	N.D.
Overton	-0.4	13.0	0.137	0.026
Pahrump	2.2	10.0	0.071	0.015

Pioche	0.7	7.2	0.112	N.D.
Rachel	-1.1	7.4	0.145	0.021
Sarcobatus	1.8	9.6	0.115	N.D.
St. George	0.4	7.2	0.097	0.027
Stone Cabin	0.7	9.0	0.082	N.D.
Tecopa	0.0	11.0	0.110	0.017
Tonopah	0.0	8.1	0.137	0.018
Twin Springs	-1.6	11.0	0.089	0.018

MDC (minimum detectable concentration)

MDC Be-7 = 0.022 pCi/m³ Pb-210 = 0.006 pCi/m³ N.D. = not detected

Table 4. TLD Analytical Results for the Third Quarter of Calendar Year 2011

Station	Third Quarter Exposure (mR)	Est. Annual Exposure (mR/yr)	2010 TLD Exposure (mR/yr)	2010 PIC Exposure (mR/yr)
Alamo	lost	--	106	120
Amargosa	28	105	94	106
Beatty	36	144	129	149
Boulder City	27	117	94	134
Caliente	30	116	104	139
Cedar City	24	92	81	100
Delta	30	116	86	106
Duckwater	35	114	103	129
Ely	30	98	91	107
Garden Valley	44	143	139	153
Goldfield	29	116	110	132
Henderson	27	117	102	121
Indian Springs	25	94	90	99
Las Vegas	24	104	87	97
Medlins Ranch	40	130	132	148
Mesquite	27	117	95	106
Milford	36	140	130	153
Nyala	32	104	100	120
Overton	24	104	87	98
Pahrump	19	72	73	73

Pioche	29	112	102	124
Rachel	32	128	118	132
Sarcobatus	41	161	140	148
St. George	23	88	70	92
Stone Cabin	41	134	131	148
Tecopa	27	102	97	129
Tonopah	33	132	122	141
Twin Springs	48	155	146	170
